PHYTOTOXICOLOGY INVESTIGATION IN THE VICINITY OF HAMILTON BRICK HAMILTON, ONTARIO SEPTEMBER 11, 1986

SEPTEMBER 1988

Ontario
Ministry of the Environment
Jim Bradley
Minister

ISBN 0-7729-4106-8

Phytotoxicology Investigation in the Vicinity of Hamilton Brick, Hamilton, Ontario September 11, 1986

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by Dr. W.D. McIlveen

Phytotoxicology Section, Air Resources Branch
Ontario Ministry of the Environment

ARB-107-87-Phyto

September 1988

c Queen's Printer for Ontario, 1988

INTRODUCTION

In response to an inquiry from staff of the West Central Regional office of the Ontario Ministry of the Environment, a preliminary survey of vegetation condition in the vicinity of Hamilton Brick was carried out by the Phytotoxicology Section, Air Resources Branch. Initial concern was raised when elevated fluoride candle readings were discovered in the vicinity of the brickyard. This report provides a summary of the results of the investigation.

FIELD INSPECTION

An inspection of the vegetation growing in the vicinity of the brickyard was conducted on September 9, 1986. When symptoms typical of chronic fluoride accumulation and toxicity were noted in close proximity to the brickyard, a survey to delineate the zone of injury was initiated. The zone examined was bounded roughly by Lawrence Avenue on the south, by Gage Street on the west, by King Street on the north and by Graham Street on the east. This area encompasses Gage Park and a residential area of approximately the same area. The south limit was largely determined by the steep slope of the Niagara Escarpment in that area.

A set of 11 permanent sample stations was established for observation and collection of foliage samples. These stations are located as follows with respect to the kilns at Hamilton Brick and are shown in Figure 1.

Station	Location	Position
1	Lawrence & Rosslyn	50 m N
2	Rosedale Lawn Bowling	550 m NNW
3	Maplewood & Gage	900 m NNW
4	Rosslyn & Montclair	350 m N
5	Kensington & Central	500 m N
6	Maple & Kensington	700 m N
7	Balmoral & Lawrence	100 m E
8	Ottawa & Justine	320 m E
9	Justine & Province	600 m E
10	Lawrence & London	350 m ESE
11	Lawrence & Province	600 m ESE

At each station, injury to vegetation was assessed for typical fluoride injury. Samples of foliage of silver maple (Acer saccharinum) were collected at each station except Station 1 where this species was not available. Samples of foliage from wild grape (Vitis riparia), choke-cherry (Prunus virginiana) and elm (Ulmus americana) were taken at Station 1 for chemical analysis and for herbarium purposes. Injury assessments are included in Table 1.

LABORATORY STUDIES

The collected samples were brought to the Phytotoxicology Laboratory for processing. The samples were dried in an oven, ground in a Wiley mill and stored in glass bottles. They were then forwarded to the Ministry of the Environment Laboratory, Downsview, for chemical analysis to determine the fluoride concentration.

RESULTS

The chemical analysis results are included in Table 1. All samples except that collected at Station 3 contained fluoride in concentrations in excess of normal background (<20 µg F/g dry tissue) levels and the Phytotoxicology Upper Limit of Normal for an urban area (35 µgF/g). The highest concentrations were measured in samples collected at Stations 1 and 7 which are located nearest to the brickyard. Greater degrees of injury were associated with the higher content of fluoride.

SUMMARY

The Phytotoxicology Section conducted a surveillance investigation of the vegetation growing in the vicinity of the Hamilton Brick operation on Lawrence Avenue in Hamilton on September 11, 1986. Injury to sensitive vegetation was observed in close proximity to the operation. Injury to vegetation was associated with elevated fluoride content in the foliar tissues. The maximum fluoride concentrations measured were 820 µg/g F.

Résumé

La Section de phytotoxicologie a analysé, le 11 septembre 1986, la végétation poussant à proximité de l'usine Hamilton Brick dans l'avenue Lawrence à Hamilton. La végétation fragile proche de l'usine présentait des lésions. Ces dommages seraient liés à une teneur élevée en fluorure dans les tissus foliaires. Les concentrations maximales de fluorure étaient de 820 $\mu g/g$ F.

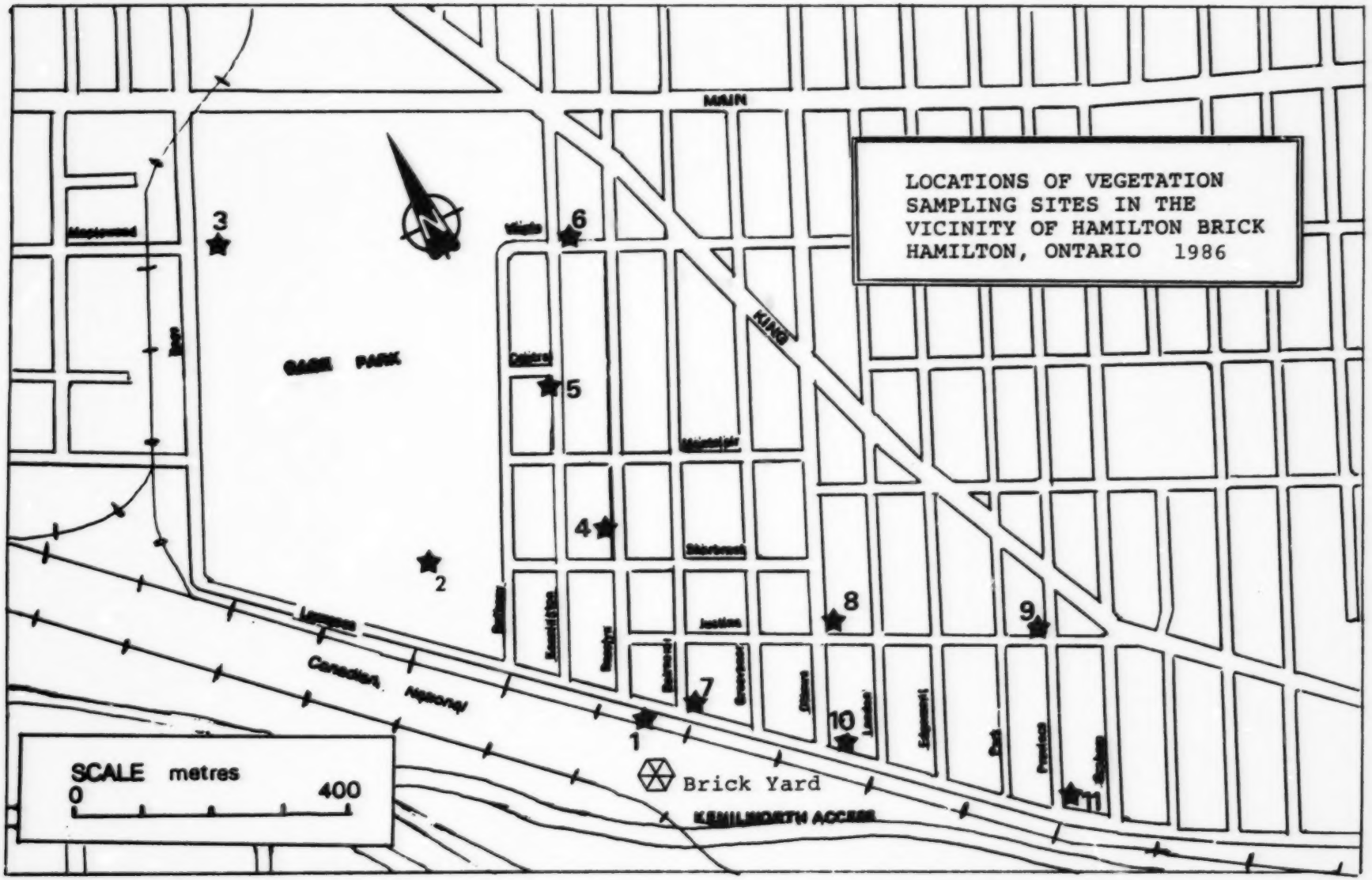
LOCATIONS OF VEGETATION SAMPLING SITES IN THE VICINITY OF HAMILTON BRICK HAMILTON, ONTARIO 1986
MAIN
KING
GAGE PARK
Canadian Nipissing
Brick Yard
KENILWORTH ACCESS
SCALE metres
0
400
1
2
3
4
5
6
7
8
9
10
11

TABLE 1 - Fluoride Content and Injury to Foliage Samples Collected in the Vicinity of Hamilton Brick, Hamilton, Ontario, September 11, 1986

Station	Species	F Concentration*	Injury Severity**
1	Wild Grape	180	Moderate
1	Chokecherry	820	Moderate
1	American Elm	400	Moderate
2	Silver Maple	40	Trace
3	Silver Maple	17	None
4	Silver Maple	105	Trace
5	Silver Maple	55	Light
6	Silver Maple	40	Trace
7	Silver Maple	820	Moderate
8	Silver Maple	54	Light
9	Silver Maple	41	Trace light
10	Silver Maple	180	Moderate
11	Silver Maple	53	Trace light

* µgF/g dry weight basis in unwashed foliage

** Injury Severity

Trace >0-1%

Light 2-10%

Moderate 11-35%

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